Sept. 13, 1927. 1,642,229

L. A. COLE

COIL FORMING MACHINE

Filed April 30, 1926 5 Sheets-Sheet 1

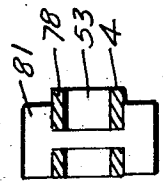


FIG. 16.

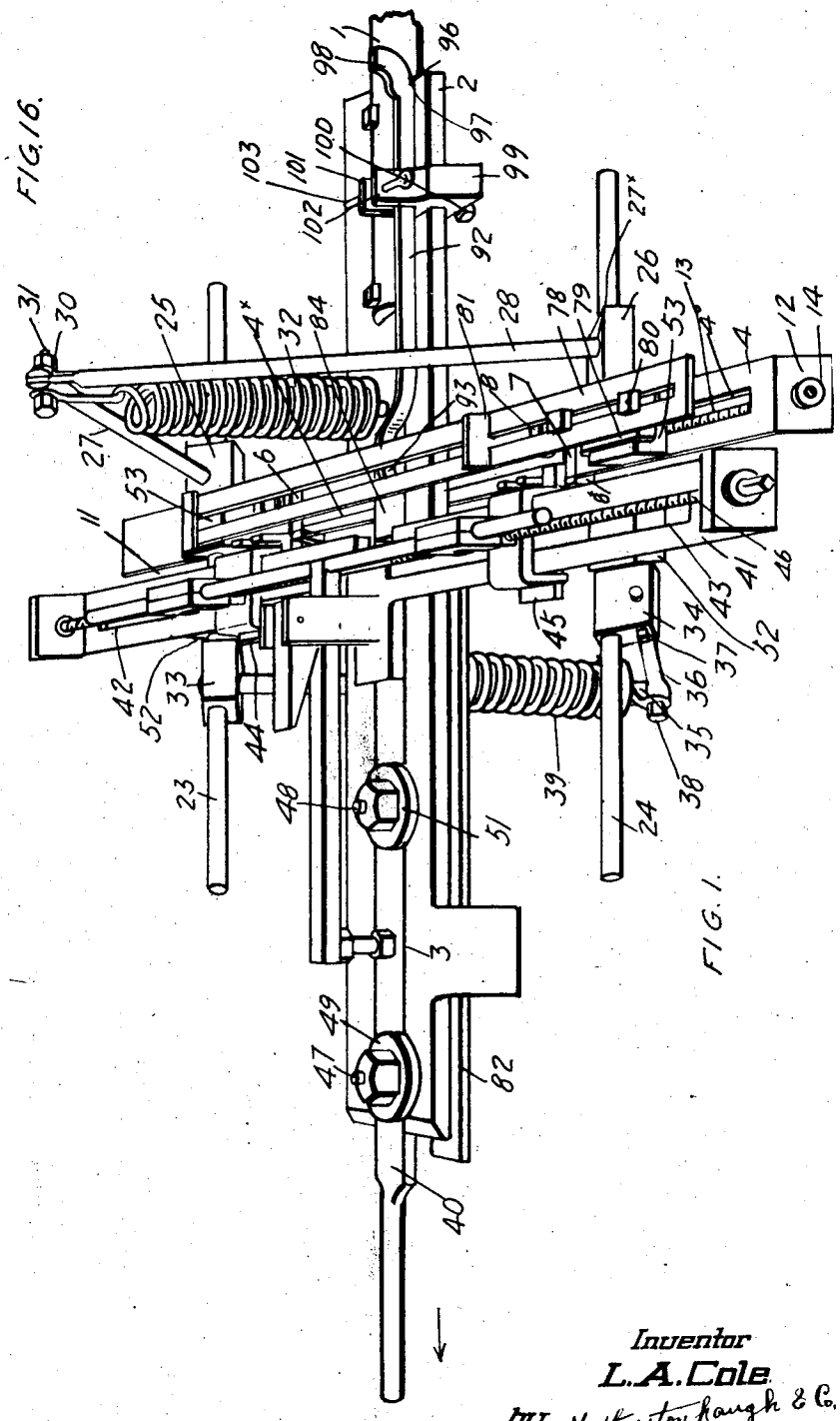


FIG. 1.

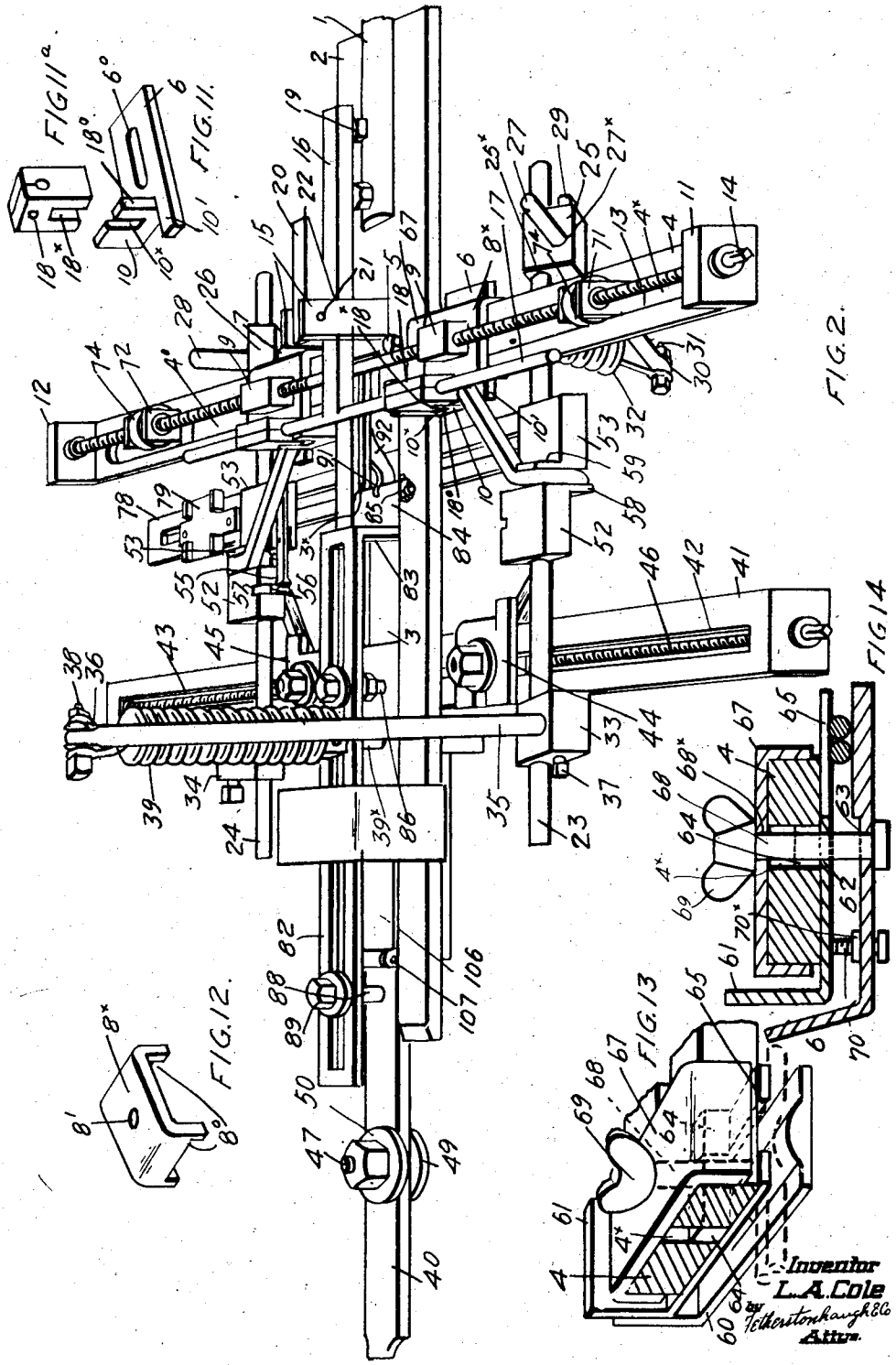
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COIL FORMING MACHINE

Filed April 30, 1926 5 Sheets-Sheet 2



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COIL FORMING MACHINE

Filed April 30, 1926 5 Sheets-Sheet 3

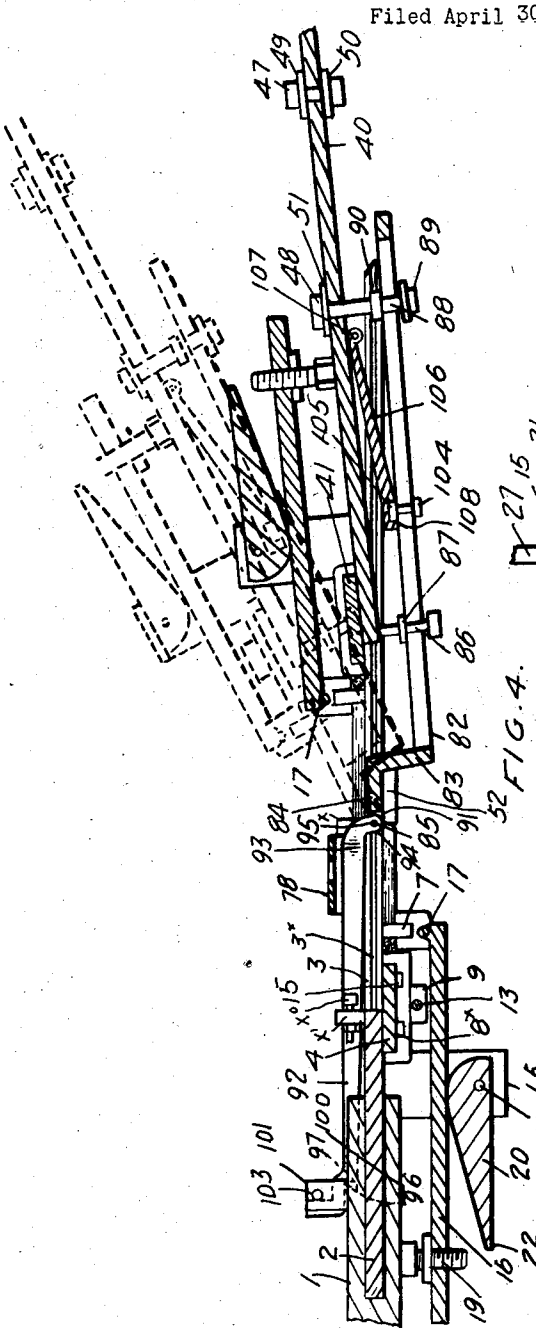


FIG. 4.

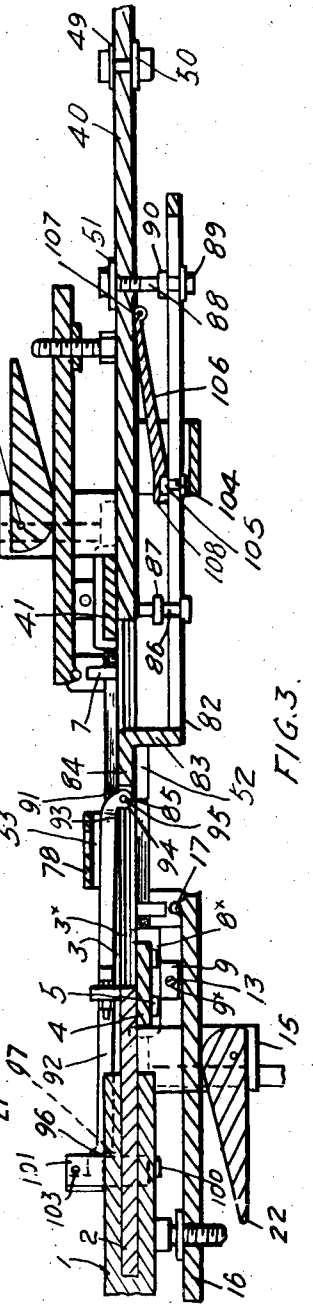


FIG. 3.

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COIL FORMING MACHINE

Filed April 30, 1926 5 Sheets-Sheet 4

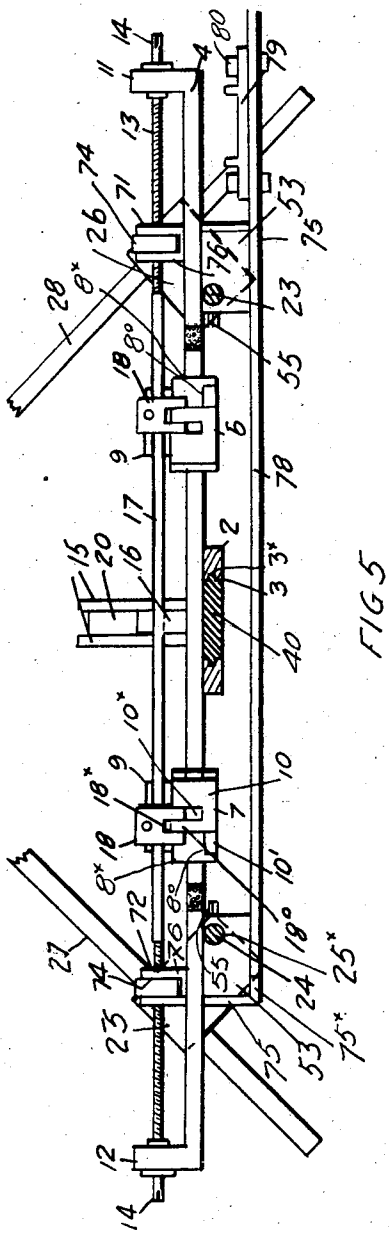


FIG 5

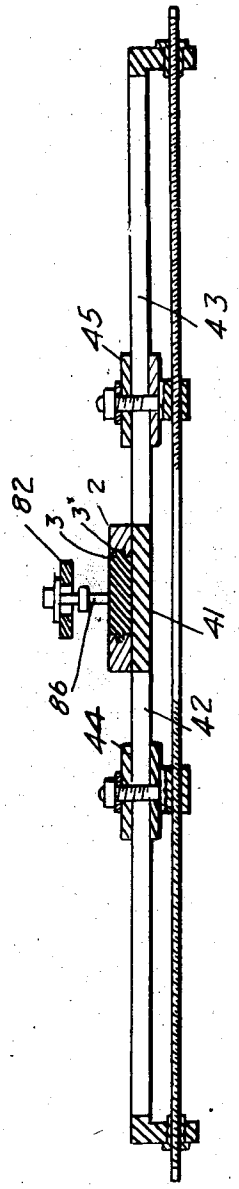


FIG. 6.

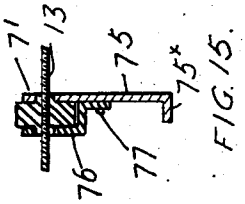


FIG. 15.

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COIL FORMING MACHINE

Filed April 30, 1926 5 Sheets-Sheet 5

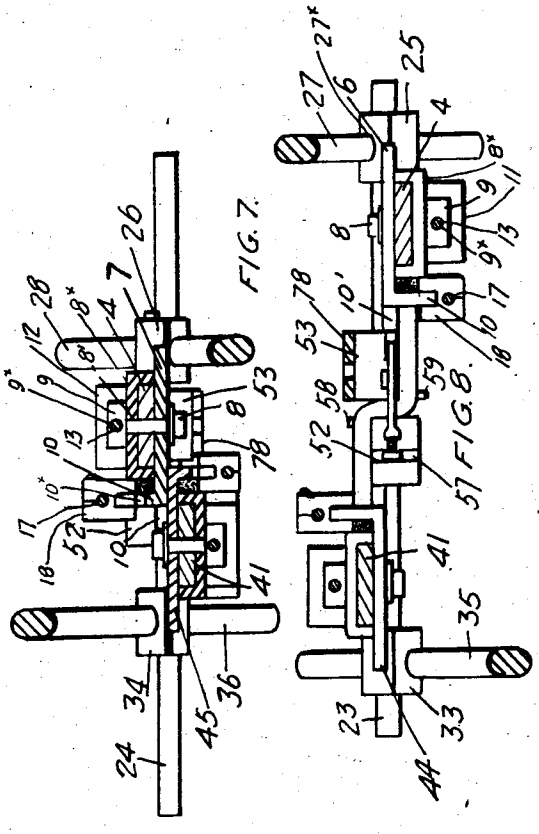


FIG. 7.

FIG. 8.



FIG. 9.

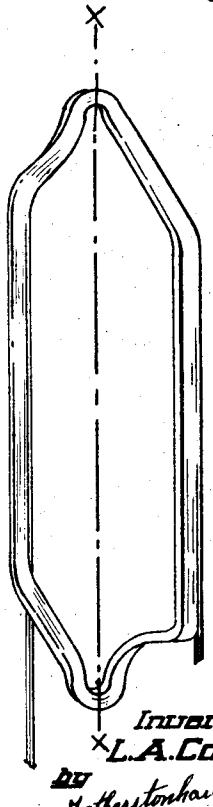


FIG. 10.

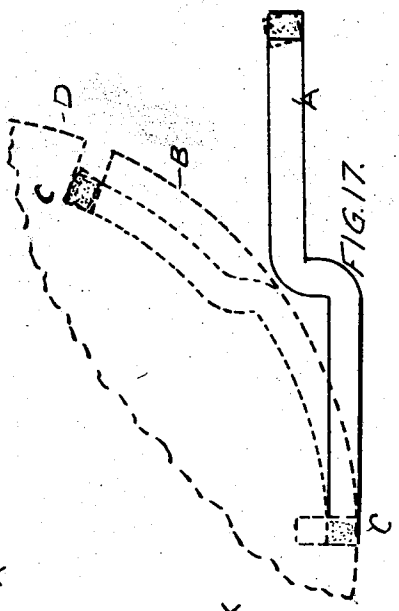


FIG. 17.

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Patented Sept. 13, 1927. 1,642,229

UNITED STATES PATENT OFFICE.

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COIL-FORMING MACHINE.

Application filed April 30, 1926. Serial No. 105,857.

My invention relates to improvements in coil forming machines, and the object of the invention is to devise in a machine of the type disclosed in my United States application Serial #22,146, filed April 10th, 1925, means for imparting to the sides of the coil the necessary angular set to permit of their easy entrance into the radial slots of a stator or rotor and their proper fitting therein without stress obviating any danger of chafing and liability to burn the machine out, to devise simple means for holding the loop end forming rods so that they will be located at the required distance at each side of the centre of the machine prior to the spreading operation, and to provide means for more definitely gripping the loop sides at the point of bend in each coil side so that they will definitely remain in the same plane during bending in the spreading operation, and it consists essentially of the arrangement and construction of parts as hereinafter more particularly explained.

Fig. 1 is a perspective view of my machine shown in the winding position.

Fig. 2 is a similar view to Figure 1 showing the parts in the spreading position, but inverted for the purpose of more clearly illustrating the parts.

Fig. 3 is a longitudinal sectional view through my machine showing the parts in the spreading position and looking from the opposite side to that illustrated in Fig. 2.

Fig. 4 is a similar view to Figure 3 showing the parts in the initial position they assume during the setting operation in full lines and the final position in dotted lines.

Fig. 5 is a transverse sectional view through my machine taken immediately in front of the stationary transverse member of my machine.

Fig. 6 is a transverse sectional view taken through the longitudinal centre of the movable transverse member of my machine.

Fig. 7 is a sectional detail view extending longitudinally of the machine and through the centre of the loop side holding jaws showing the parts in the position they assume during the loop forming operation.

Fig. 8 is a similar view to Figure 7 showing the parts in the position they assume after the spreading operation and taken at one side of the loop holding jaws.

Fig. 9 is a detail view of the loop from which the coil is formed.

Fig. 10 is a detail view of the loop after the spreading operation is completed to form the coil.

Fig. 11 is a perspective detail of one of the coil forming jaws.

Fig. 11ª is a perspective detail of the gripping members.

Fig. 12 is a detail of the saddle plate coacting with the jaws illustrated in Figure 11.

Fig. 13 is a perspective detail of the lead holder whereby the lead end of the wire forming the loop is secured in a stationary position to one of the transverse members 4 or 41.

Fig. 14 is a sectional view through Figure 13.

Fig. 15 is a sectional view through one of the adjustable stops 71 or 72.

Fig. 16 is a sectional detail through the bar 78 and member 4 showing the key 81 locking the same together.

Fig. 17 is a diagrammatic view showing the position assumed during the setting operation.

In the drawings like characters of reference indicate corresponding parts in each figure.

It might be first pointed out that in forming a coil the wire is wound into what is known as a loop and such loop does not become known as a coil until it is spread as hereinafter described.

1 indicates a shaft carrying the main supporting member 2 in the form of a bar provided with a longitudinally extending open ended slot 3, the opposing edges of which are provided with longitudinally extending guideways 3^x. 4 is a transverse bar member which is secured to the supporting member 2 at a point intermediately of its length by means of bolts 5 or other securing means. The member 4 is provided with longitudinal slots 4^x and 4^0 extending from each side of the centre thereof. 6 and 7 are jaw members secured to the transverse bar member 4. Each jaw member 6 and 7 is formed with a plate like portion, see Fig. 11, provided with a longitudinal slot 6^0 through which a securing bolt 8 extends.

8^x is a saddle plate which straddles the transverse member 4 and is provided in each end edge with a recess 8^0 into which the body of the jaw member 6 or 7 fits. 8^1 is an orifice in the centre of the saddle plate through which the bolt 8 also extends. The bolt 8 is provided with a rectangular block like head 9 through which extends an inter-

nally threaded orifice 9^x for a purpose which will hereinafter appear.

It will be noted that a jaw member 6 or 7 and saddle plate 8^x are secured together by the bolt 8 passing through the longitudinal slot 4^x or 4^0 so as to slide longitudinally of the transverse member 4 as one unit.

The body portions of the jaw members 6 and 7 are provided with out-turned portions 10 extending partially across the jaw member 6 and provided with an open ended slot 10^x. The remaining portion of the body portion is extended horizontally as indicated at 10^1 so as to form a support for the loop at the point of bend as it is spread into the coil.

11 and 12 are bearing ends carried by the transverse member 4. 13 is a spindle provided at one end with a right hand thread and at the other end with a left hand thread which is journalled in the bearing ends 11 and 12 and held therein from longitudinal movement, such spindle extending longitudinally of the transverse member 4 and passing through the internally threaded orifice 9^x of the heads 9 so that the right hand thread engages with one head and the left hand thread with the other head, the spindle being provided at its ends with a squared portion 14 to permit of its engagement with a wrench. By turning the spindle it will be readily seen that the jaw members 6 and 7 may be simultaneously adjusted to any position at an equal distance from the centre of the machine according to the length of the coil side desired to be formed.

In order to hold the coil side within the jaw members 6 and 7 I provide the following device.

15 are a pair of standard members carried by the supporting member 2 adjacent to the transverse member 4. 16 is a bar member extending freely between the standard members 15. 17 is a rod formed integral with the inner end of the bar member 16 and extending transversely of the machine. 18 are movable gripping members clamped upon the rod 17 and provided in its lower edge with a transverse notch 18^x into which the small portion 18^0 of the out-turned portion 10 of the jaw members 6 and 7 fit as clearly indicated in Figure 5.

In order to support the outer end of the bar 16 I provide a set screw 19 the head of which bears upon the shaft 1. By adjusting the set screw 19 the bar 16 may be adjusted to a horizontal position according to the height of the coil desired to be formed by the machine.

20 is a clamping cam pivotally mounted at 21 in the standard members 15 so that by manually forcing the end 22 thereof downward from a vertical position to the position shown in Figs. 2 and 4, the bar member 16 is also forced downward the head of the set screw 19 against the shaft 1 and the gripping members 18 into contact with the upper face of the wound loop side.

23 and 24 are a pair of rods extending longitudinally of the machine and at each side of the supporting member 2. 25 and 26 are blocks each provided with an orifice 25^x through which the rod members 23 and 24 extend. 27 and 28 are rods extending through the blocks 25 and 26 as indicated at 27^x being adjustably secured therein by set screws 29. The converging ends of the rods 27 and 28 are provided with an interengaging tongue and jaw connection 30 through which a pivot bolt 31 extends for connecting the parts together.

32 is a tension spring secured at one end to a pivot bolt 31 and at its opposite end to the supporting member 2. 33 and 34 are blocks also slidably carried upon the rods 23 and 24 in proximity to the opposite ends thereof. 35 and 36 are rods extending through the blocks 33 and 34 and secured therein by set screws 37 their converging ends being connected together by a pivot bolt 38 similarly to the pivot connection of the rods 27 and 28. 39 is a tension spring connected at its outer end to the pivot bolt 38. 40 is a slide bar fitting within the open ended slot 3 of the supporting member 2 so as to be slidable longitudinally therein. The lower end of the spring 39 is secured to a bolt 39^x extending from the slide bar 40 and through the slot of the bar 82. 41 is a transverse bar member secured to the slide bar 40 so as to be movable therewith. The transverse bar member 41 is provided with longitudinal slots 42 and 43.

44 and 45 are jaw members secured to the transverse bar member 41 in a similar manner to the jaw members 6 and 7. The jaw members 44 and 45 are oppositely set to the jaw members 6 and 7 as will be clearly seen on referring to Figures 7 and 8 so as to receive the opposite parallel side portion of the loop. The jaw members 44 and 45 are also simultaneously adjusted by a screw spindle 46 in a similar manner to that described in connection with the jaw members 6 and 7 and screw spindle 13.

47 and 48 are bolts which extend through the slide bar 40, the bolt 47 being provided with a pair of washers 49 and 50 over hanging the edges of the slide bar so as to engage the supporting member 2 at each side of the slide bar. The bolt 48 is provided with a washer 51 also over hanging the slide bar 40 so as to bear upon the upper face of the supporting member 2 when the device is in the spreading position and after the bolt 47 and washer 49 have passed the supporting member 2.

52 and 53 are blocks. The blocks 53 are secured in a stationary position upon the rods 23 and 24. A block 52 is slidably

carried on each rod 23 and 24 and is connected to the block 53 by means of the spring pressed latch 55 carried by the block 53 and provided with a screw 56, the head of which engages a groove or indentation 57 formed in a block 52. By adjusting the screw 56 the blocks 52 and 53 may be spaced apart according to the thickness of the loop to be wound. It will be noted that the blocks 52 and 53 are provided with outward extensions 58 and 59 between which the loop ends extend and whereby such loop ends are held in parallel relation during the spreading operation as will hereinafter more fully appear.

In order to perform the loop winding operation the parts assume the position shown in Figure 1. The end of the wire out of which the loop is formed is first secured to the transverse member 4 by means of a clamping device illustrated in Figure 13 and which consists of a pair of angle members 60 and 61 fitting one within the other and extending beneath the transverse member 4. 62 and 63 are orifices formed in the members 60 and 61 and 64 are projections extending upward from the member 61 and adapted to fit within the longitudinal slot $4^{\times}$ of the member 4 so as to hold the member 61 definitely in a right angular position thereto. 65 is an open ended slot formed in the member 61 directly above a projecting rib 66 on the member 60 to form gripping means for the lead end of the wire extending therethrough. 67 is a saddle member extending over the transverse member 4, and 68 is a bolt extending through the orifices 62 and 63 and the orifice $68^{\times}$ of the saddle member 67. 69 is a butterfly nut by which the members 60 and 61 are drawn together to carry the rib 66 into contact with the lower face of the lead wire and the portions of the member 61 forming the slot 65 against the upper face of the lead wire.

In order to adjust the plates 60 and 61 to a parallel position in accordance with the thickness of the wires to be gripped thereby I provide a set screw 70 extending through the angle member 60 against the lower face of the angle member 61, the set screw 70 being provided with a lock nut $70^{\times}$. By this means the lead end of the wire is first clamped to the transverse member 4.

Before winding the loop it is first necessary to lock the rods 23 and 24 in a stationary position accurately centered from each side of the longitudinal centre of the machine. In order to do this I have devised the following device.

71 and 72 are adjustable stops. Each stop 71 and 72 consists of a knurled nut 74 engaging the thread of the spindle 13. 75 and 76 are bracket members extending at each side of the nut 74 and secured together as indicated at 77, the extremity of the bracket 75 being turned inward at $75^{\times}$ so as to receive the blocks 53 of the rods 23 and 24. By this means the distance apart of the blocks 53 and the rods 23 and 24 extending therethrough are definitely set and centered at each side of the longitudinal centre of the machine. In order to hold the rods 23 and 24 from inward movement during the winding of the loop I provide a longitudinally slotted bar 78 secured to the block 53 of the rod 23 and provided at its opposite end with a recessed plate 79 into which the block 53 of the rod 24 is adapted to fit when the rods 23 and 24 are in their spread apart position. The plate 79 is adjustably secured to the bar 78 by means of bolts 80 extending downward from the slot of the bar 78 whereby the plate 79 is adjusted according to the length of the loop desired to be wound.

When in the winding position the clamping members 18 are removed from the jaws 6 and 7 and the bar 16 drawn backward into position to carry the rod 17 into close proximity with the standard members 15 to a corresponding position to that indicated in Figure 1 of the drawing where the clamping members corresponding to the jaws 44 and 45 are drawn back to the winding position. The end 22 of the cam 20 is forced downward against the bar 16 to lock it in the withdrawn position. The shaft 1 is then rotated so as to rotate the whole device and as the device rotates the wire passes from its point of attachment into the jaws 6 and 7 around the rod 24 and then through the jaws 45 and 44 and then around the rod member 23 and then back into the jaws 6 and 7, the winding operation continuing until the loop is completed.

It may be stated that during the winding operation that a key 81 connects the slotted bar 78 to the transverse member 4 thereby securely holding the block 53 between the recessed member 79 carried by the bar 78 and the transverse member 4.

After the winding operation the cam member 20 is thrown to a vertical position so as to free the bar member 16 which is then moved forward so that the gripping members 18 are carried to the position shown in Figure 2 so that they bear upon the upper face of the coil side and engage with the jaws 6 and 7 as hereinbefore described. The cam 20 is then thrown down to lock the parts in position and thereby secure the coil side from movement. It will of course be understood that a similar operation takes place on the opposite side of the machine so that the other coil side is similarly located in the jaws 44 and 45.

After the winding operation is complete the key 81 is removed by simply turning it to a position at right angles to the position shown and passing it upward through the slots of the transverse member 4 and bar 78.

After the key is removed the bar 78 is slightly raised at its free end so as to clear the block 53 out of engagement therewith. The natural tension of the wound loop will then draw the block clear of the member 79. The bar 40 is then drawn longitudinally in the direction of arrow see Figure 1 to the required distance limited by mechanism which will hereinafter be described.

By the moving of the slide bar 40 the jaw members 43 and 44 are drawn apart from the jaw members 6 and 7. As the slide member 40 is drawn in the direction of arrow the rods 23 and 24 are also carried in the same direction by reason of the coil ends inserted between the blocks 52 and 53. By this means the coil is spread from the loop form shown in Figure 9 to the form shown in Figure 10.

In order to limit the spread of the coil I provide the following mechanism.

82 is a slotted bar extending parallel with and above the slide bar 40 in the inverted position shown in Figure 2. The inner end of the bar 82 is provided with a downward extension 83 extending into the open ended slot 3 of the bar support 2 and with a further horizontal extension 84 provided with a pivot pin 85 projecting into the guideways 3^x and forming a pivot support for the bar 82. The bar 82 is connected to the slide bar 40 by means of a bolt 86. 87 is a nut set upon the bolt 86 to permit of a certain amount of movement between the bar 82 and slide bar 40 when operated as hereinafter described.

88 is a bolt extending from the slide bar 40 through the slot of the bar 82 provided with a nut and washer 89 on one side of the bar 82 and with an enlargement 90 on the opposite side of the bar so as to permit of the free sliding movement of the slide bar 82 and a certain amount of tilting movement between the nut and washer 89 and the enlargement 90.

91 is a notch formed in the extremity of the portion 84. 92 is a link provided at its inner end with an inwardly offset portion 93 terminating in an inturned portion 94 extending into the notch 91 and provided with an orifice 95 through which the pivot pin 85 hereinbefore described extends thereby pivotally connecting the inner end of the link 92 to the inner end of the extension 84. The opposite end of the link is provided with a recessed portion 96 forming a shoulder 97 and an upturned portion 98. 99 is a bracket adjustably secured to the supporting bar 2 by a set screw 100. The bracket 99 is provided with opposing lug portions 101 and 102 through which the link 92 extends. 103 is a pin extending transversely through the lugs 101 and 102. The distance between the pin 103 and the inner side of the bracket 99 corresponds to the distance between the inner edge of the upward projection 98 and the shoulder 97 so that when the slide bar 40 is drawn in the direction of arrow to spread the coil when drawn to its limit carries the projection 98 into engagement with the transverse pin 103 and permits the shoulder 97 to drop so as to engage with the inner face of the bracket 99 and thereby lock the link from movement in either direction and consequently the slotted bar 82 thereby positively locating the pivot pin 85 approximately on the imaginary center line of the spread coil as indicated by the dash line x—x Fig. 9. After the mechanism has assumed the above position the slide bar 40 is drawn further out so as to complete the spread of the coil so that the corresponding side of the coil is an equal distance from the pivot pin 85 to the opposite side of the coil side, this distance being limited by the mechanism I will now describe.

104 is a bolt provided with a head 105 secured in a stationary position in the slot of the bar 82. 106 is a link pivoted at 107 to the slide bar 40. The free end of the link 106 is provided with a recess 108 so as to fit over the top of the bolt head 105. It will also be noted that the lower edge of the link 106 is inclined so as to readily permit the link riding over the head of the bolt 105 as the slide bar 40 is drawn outward.

After the first coil is spread the required distance the bracket 99 and the bolt 104 are set in such a position that the spreading of the coil is limited to the required distance apart of the coil sides and at the same time locating the pivot pin 95 approximately on the centre line x—x of the spread coil.

It will be noted when the slide bar 40 is drawn to the position above described that the washers 49 and 50 are carried to a position clear of the supporting member 2.

After the spreading operation has been completed as above described, in order to provide for the setting operation it is necessary that certain parts of the machine be removed. In order to do this the springs 39 and 32 are disconnected from the pivot bolts 48 and 31, the blocks 33 and 34 and 25 and 26 together with the rods 35 and 36 and 27 and 28 are removed from the rods 23 and 24. The latch 55 is then opened and the blocks 52 slide away from the blocks 53 permitting the blocks 53 together with the rods 23 and 24 to be moved inward to the wide part of the coil so that they can be passed longitudinally through the coil so as to be removed therefrom.

After the foregoing parts have been removed the slide bar 40 is thrown upward first assuming the position shown in full lines in Figure 4 and then the dotted position. In Fig. 17 I have shown one of my coils in section in the position it assumes

directly after the spreading and the rotor B with slots C and C× to which my coil is to be applied in dotted lines. When in the full line position the coil side A× forms the pivot point around which the swinging movement takes place, the coil side A× assuming the dotted position A indicated in Figure 17. During this movement the slotted bar 82 at a point adjacent to the inner end of the slide bar 40 is carried upward towards such slide bar, this movement being limited by the nut 87 on the bolt 86. This operation gives the required angular set to the coil side so that its final position will be radial to the centre of the stator or rotor to which it is to be applied, otherwise, when the coil is set to the rotor the coil side A× would assume the incorrect position D so that it could not enter the slot C×. It will, therefore, be seen a correction of set as indicated at A is first necessary. When this set has been obtained the slide bar 40 is thrown up to the position shown by dotted lines in Figure 4. This movement pivoting around the centre formed by the pivot pin 94 thereby carrying the coil side upward off the supporting bar 2 so that in the final position the two coil sides have the correct angular relation to fit the slots C perfectly.

It may be pointed out that when the spread coil is set to fit the rotor or stator that the converging portions of the coil side extending between the parallel portions of the coil sides and the coil ends take a curve automatically corresponding to the curve required to fit the periphery of the rotor or stator as clearly shown in Figure 17.

In order to limit the return movement of the mechanism from the spreading position to the loop winding position I provide stops X and X^1, the stop X being provided with a set screw X^0 so as to control the position to which the movable member 41 is returned in relation to the stationary member 4 and according to the thickness of the loop desired to be wound by the mechanism.

After the coil assumes the final shape with the machine in the dotted line position Figure 4, the coil side in jaws 44 and 45 is removed by the operating of cam 20 on movable transverse member 41 and withdrawal of blocks 18 from said jaws. Then by removing pin 103 the slide bar 40, bar 82, link 92 and attached parts are removed from the machine. The coil is then easily removed from the machine by operating cam 20 etc., of stationary traverse member 4.

What I claim as my invention is:

1. In a coil forming machine, the combination with the main support, a stationary member carried by the main support, gripping means carried by such stationary member adapted to grip one side of a wound loop, a movable mechanism slidably carried by the support, a slide bar slidably carried by the support to move in a direction at right angles to the stationary member and by which the movable member is carried, and gripping means carried by the movable member adapted to grip the other side of the coil, of a stop link pivotally connected to the movable mechanism, a coacting stop carried by the support adjacent the stationary member, a stop link pivotally mounted at one end to move with the movable member, and a stop coacting with the free end of the stop link when the movable member is moved to the limit of its movement.

2. In a coil forming machine, the combination with the spreading mechanism including the means for separately gripping each coil side, of means for first imparting an angular set to one side of the coil while the other is gripped in a stationary position, and means for swinging the set side of the coil upward and inward toward the stationary side until both coil sides are radial to a common centre.

3. In a coil forming machine, the combination with the stationary support provided with a longitudinally extending guideway, of a stationary transverse member carried by the support, gripping means carried by the stationary member for gripping one coil side, a slide bar slidably carried within the guideway, a movable transverse member carried by the slide bar, gripping means carried by the movable member for gripping the other side of the coil, a bar carried by the aforesaid slide bar to move longitudinally thereof and extending at its inner end into the guideway, a stop link pivotally connected to such inner end, a stop carried by the supporting member with which the stop link engages to lock it from movement in either direction when the movable member is carried towards the coil spreading position, a link pivotally carried by the slide bar having a receiving recess in its free end, and a stop projection extending from the bar carried by the slide bar and with which said recess engages when the movable transverse bar is carried to the coil spreading position.

4. In a coil forming machine, the combination with the supporting member, a stationary transverse bar carried thereby and gripping means carried by such stationary transverse bar adapted to grip one side of the coil, a slideway formed in the supporting member, a slide bar slidably supported within said slideway and adapted to be swung upward when carried to the coil spreading position, a movable transverse bar member carried by the slide bar, gripping means carried by the movable transverse bar member adapted to grip the other side of the coil, a fulcrum pin slidable within the guideway, a bar member pivotally mounted upon the

fulcrum pin, a slidable connection between such bar member and the slide bar, and stop means adapted to locate the fulcrum pin centrally between the coil sides when the slide bar is drawn outward to the coil spreading position.

5. In a coil forming machine, the combination with the main support having a longitudinal slideway, a stationary bar member carried by the main support transversely thereof, a movable bar member also carried by the main support and extending transversely thereof, gripping jaws carried by the stationary and transverse bar member adapted to engage the coil sides at a distance from the coil ends, tongue members forming part of the gripping jaws and adapted to extend beneath the coil side at the point of bend and at the outer side of the gripping jaws, means for gripping the coil sides over the point of bend, and movable means supporting the coil ends during the spreading operation.

6. In a coil forming machine, the combination with the main support provided with a longitudinal guideway, a transverse stationary bar member carried by the main support, a movable transverse bar member also carried by the main support, gripping means carried by the stationary and movable transverse bar members to separately grip each coil side, and means for supporting the coil ends during the spreading operation comprising parallel rods extending at right angles to the aforesaid transverse members and around which the coil ends pass, a stationary block mounted upon each rod at one side of each coil end, a movable block carried by each rod at the opposite side of each coil end, and means for detachably connecting the movable and stationary blocks together.

7. In a coil forming machine, the combination with the main support provided with a longitudinal guideway, a transverse stationary bar member carried by the main support, a movable transverse bar member also carried by the main support, gripping means carried by the stationary and movable transverse bar members to separately grip each coil side, and means for supporting the coil ends during the spreading operation comprising parallel rods extending at right angles to the aforesaid transverse members and around which the coil ends pass, a stationary block mounted upon each rod at one side of each coil end, a movable block carried by each rod at the opposite side of each coil end, adjustable means for detachably connecting the movable and stationary blocks together whereby the distance apart of the stationary and movable blocks is varied.

8. In a coil forming machine, the combination with the main support provided with a longitudinal guideway, a transverse stationary bar member carried by the main support, a movable transverse bar member also carried by the main support, gripping means carried by the stationary and movable transverse bar members to separately grip each coil side, and means for supporting the coil ends during the spreading operation comprising parallel rods extending at right angles to the aforesaid transverse members and around which the coil ends pass, a stationary block mounted upon each rod at one side of each coil end, a movable block carried by each rod at the opposite side of each coil end, and a spring latching finger carried by each stationary block and adapted to engage the movable block to hold it in position in relation to the stationary block.

9. In a coil forming machine, the combination with the main support provided with a longitudinal guideway, a transverse stationary bar member carried by the main support, a movable transverse bar member also carried by the main support, gripping means carried by the stationary and movable transverse bar members to separately grip each coil side, and means for supporting the coil ends during the spreading operation comprising parallel rods extending at right angles to the aforesaid transverse members and around which the coil ends pass, a stationary block mounted upon each rod at one side of each coil end, a movable block carried by each rod at the opposite side of each coil end, and a spring latching finger provided with a set screw at its outer end, the head of which is adapted to engage the movable block to hold it in the adjusted position in relation to the stationary block.

10. In a coil forming machine adapted to form a diamond shaped coil, the combination with the movable transverse bars, of gripping members carried by the bars and each formed by a plate having an upturned inner end portion forming a vertical slot between which and the transverse bar the coil side is adapted to extend, an inwardly extending horizontal tongue portion extending at one side of such upturned portions and adapted to support that portion of the coil side at the point of bend, and a movable gripping member coacting with each of the aforesaid members and comprising a block having an open ended slot forming depending portions at each side of the slot, one portion fitting into the slot of the gripping members and the transverse bar and upon the coil side, and the other portion upon the coil side at the point of bend directly above the horizontal tongue.

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